Independent Implementation Review (IIR) Checklist
7/2/02

1) **Requirements:**
   Note: since the following questions in this section were addressed at the NAR, the IIR should address them only when there is a change in requirements.
   a) Are the Level I requirements clear and consistent? Are they clear and traceable from Agency policy? Are they being communicated and followed?
   b) Are the Level I requirements reasonable and achievable?
   c) Do minimum and full Mission Success Criteria exist? Are the criteria relevant and measurable?
   d) Are the requirements flowed down from Level I through the appropriate lower levels?
   e) Are the requirements specific and realistic at the appropriate level?
   f) Do the projects within the program directly support a requirement - do they have an "allocation" in support of a program goal?
   g) Are there partners external to NASA with requirements? Does the program clearly understand these external requirements?
   h) To what extent is the program driven by commercial needs? Are commercial viability requirements identified and documented?
   i) Is there a formal process to review and incorporate "lessons learned" from other successful and failed NASA programs and is it being effectively applied?
   j) Are there exit criteria?
   k) Are there requirements for project termination (for poor performance)?

2) **Technical Performance:**
   *Note: since the following questions (marked as ***) were addressed at the NAR, the IIR should address them only when there is a technical change to the baseline.*
   a) Have sufficient trade studies been completed at the mission, element, system and subsystem level? ***
   b) Is there sufficient technical analysis in all elements, systems, subsystems and technical disciplines to provide assurance of the ability to meet the requirements? ***
   c) Is redundancy policy adequate, well understood and communicated to the entire team? Is it being followed? ***
   d) Are all margins adequate?
   e) Validation and verification:
      i) Is there a credible verification and validation plan?
      ii) Is the verification matrix complete?
      iii) Are the processes sound?
      iv) Are checks in place to ensure processes are being followed?
      v) Does every process have an owner?
      vi) Is mission-critical software identified in both the flight and ground systems?
      vii) Are processes developed for validation of system interfaces? Does verification include use of breadboards, simulation, development hardware and software, and flight articles? Are facilities established for simulation, verification and validation?

viii) Is independent validation and verification planned for flight and ground software?
ix) Are plans and procedures in place for normal and contingency testing?
x) Is time available for contingency testing and training?
xi) Are tests repeated after configuration changes?
xii) Are adequate end-to-end tests planned and completed?

f) Technology readiness:
i) Is any new technology needed that has not matured adequately?
ii) Has all appropriate new technology been considered?
iii) Is any outstanding new technology maturing on schedule?
iv) Does it represent acceptable deployment risk?
v) Is there a plan in place to train operations personnel on new technology use and limitations?

g) Operations:
i) Has a mission operations concept been documented?
ii) Have ground operations been developed and documented?
iii) Have appropriate mission ops system (hardware and software) trades been completed?
iv) Are there plans to integrate the ops team into the flight hardware development effort to help ensure a qualified ops team?

3) Cost:

a) Is the updated Independent Life Cycle Cost Estimate (ILCCE) showing that adequate budget remains? Is it phased appropriately?
b) Are the remaining cost reserves still adequate?
c) Cost control procedures/processes:
i) Is actual cost (full cost) tracked and variance analysis performed?
ii) Has Earned Value Management (EVM) been implemented appropriately?
iii) Is cost accountability appropriately distributed?
iv) Are cost estimates periodically developed by the program?
v) Are cost liens/encumbrances tracked?
vi) Are workforce levels tracked and plans adjusted as needed?
d) Is the program's budget accepted and funded by HQ?

4) Schedule:

a) Is this an integrated logic network or just a task list?
b) What is the critical path?
c) What is the 2nd critical path?
d) What is the difficulty level (technologies, development, etc.) of the items on the critical path? What are high-risk items on the critical path?
e) How does schedule allow for these difficulties? What is the mitigation plan for high-risk items on the critical path?
f) What are the constrained dates in the schedule?
g) How much slack is carried in schedule? Where is it located?
h) Is slack being used up and thereby threatening the reliability of the schedule?
i) What are long lead-time items and where are they scheduled?
j) What is the calendar for schedule (e.g. day week, holidays, shut down, etc.)?

k) How have non-interruptible test being handled (e.g. thermal, calibration, etc.)?
l) Are there predecessors and successors for each task?
m) Does schedule reflect WBS?
n) Are low, intermediate, and master level schedules integrated?
o) What is the staffing plan?
p) Are schedule resources loaded?
q) What, if any, are potential facility/equipment conflicts?
r) Is there a schedule baseline and is it under the change management process? If not when planned?
s) How is rework carried in the schedule?
t) What is the process for managing and reporting of schedule (especially for very large schedules or program with several partners and contractors)?
u) Are the time scales for the development decisions and technology readiness reasonable and credible?
v) Are safety issues considered and maintained as part of cost/schedule trade-offs?

5) Risk Management:

a) Has a Risk Management Plan been established, approved and utilized; and is it credible?
b) Does the Risk Management Plan identify how risks are identified, analyzed, tracked and controlled? Is the Plan followed?
c) Has the acceptable level of risk been identified and bought into at all management levels?
d) Is the project using it's own risk management process?
e) Are "unknowns" anticipated and is there margin to deal with them?
f) Are risks integrated with the cost and schedule estimates?
g) Are analysis measures in place (Failure Modes and Effects Analysis, Fault Tree Analysis, Probabilistic Risk Assessment)?
h) Have single-point failures been identified and justified?
i) Has special attention been given to proper reuse of hardware and software?
j) Is extensive testing being done in the flight configuration?
k) Have potential failure scenarios been identified and modeled?
l) Is there a culture that never stops looking for possible failure modes?
m) Are risks being mitigated as planned?

6) Management:

a) Is there a PCA and Program Plan, or Project Plan in place, and is it in compliance with the template in NPG 7120.5A?
b) Is this the "right" NASA management team? Is this the "A" team?
c) Is this the "right" contractor team? Is this the "A" team?
d) Are the Centers working together? Is there duplication of effort? Are the Centers sharing and integrating information and results?
e) Has the management team dealt with issues effectively thus far?
f) Has the "right" balance between in-house and contracted work been achieved?
g) Does the program have sufficient insight and oversight of the contractors?
h) Are there overtime guidelines in place to prevent burnout?
i) Have other forces (Political, Agency/Center Management) influenced the program management to do things they really wouldn't otherwise have done?

j) Does the Program have an appropriate level of foreign involvement? Are safeguards in place to prevent proliferation of sensitive technologies?
k) Is a plan in place to ensure senior management oversight of the project? How does the PM reporting to 2 people work?
l) Is there a shortage of personnel relative to staffing plans? If yes, what is being done to remedy this situation?
m) Is a plan in place to ensure line organization commitment and accountability?
n) Is a plan in place to mentor new and/or inexperienced managers?
o) Are extensive peer reviews conducted at the system/subsystem level?
p) Is there a "product oriented" WBS?
q) Are there appropriate configuration control/data management/change distribution processes implemented?
r) Is acquisition strategy/contract type(s) appropriate?
s) Are there adequate resources available?
t) Is there a contingency plan?
u) Is there a descope plan?
v) Are international agreements, MOU's in place if there is international participation?
w) Is there an organized, systematic decision making process established, including risk management, to increase the likelihood of achieving overall project objectives? Is it being followed?
x) Team/communication:
    i) Are decisions being made in a timely manner?
    ii) Is "Mission Success First" clearly communicated throughout the organization?
    iii) Is open communication evident, with all parties having an opportunity to be heard?
    iv) Is a "Top 10" or something similar reviewed and acted upon weekly?
    v) Are all team members encouraged to report problems?
    vi) Do all team members understand that the only real success is mission success?
    vii) Is safety the number-one priority?
    viii) Has team chemistry been considered, and personality profiles reviewed?
    ix) Are people who could not demonstrate teamwork gone?
    x) Is the team adequately staffed and trained in the processes?
    xi) Are team members supportive and open with one another, review boards and management?
    xii) Does the team actively encourage peer reviews?
    xiii) Does the team understand that arrogance is their number-one enemy?
    xiv) Does the team understand that "anyone's problem is my problem"?
    xv) Does the team have assessment metrics, which are evaluated regularly?
y) Continuity/handovers:
    i) Are handovers planned?
    ii) Are special plans in place to ensure a smooth transition?
    iii) Do core people transition? Who? How many?
    iv) Is a development-to-operations transition planned?
    v) Does development-team knowledge exist on the operations team?

vi) Is a transition from the integration-and-test ground system to new-operations ground system planned? If so, is there a plan and schedule to revalidate databases and procedures?
vii) Have there been changes in management or other key technical positions? How was continuity ensured?
viii) Have processes changed? If so, has the associated risk been evaluated?

7) Systems Engineering:

a) Is this a program driven by systems engineering?
b) Are the systems engineering efforts effective?
c) Is systems engineering represented on the senior management staff?
d) Are the systems engineering personnel adequately trained and are they effective?
e) Does mission architecture provide adequate data for failure investigation?
f) Is "Mission Success First" reflected in the trades and systems efforts?
g) Are action items from internal and independent reviews being addressed?
h) Is a rigorous change control process in place?
i) Have design decisions and limitations been documented and communicated?
j) Is a process of continuous, complete and current documentation in place to support unanticipated personnel changes?
k) Is electronic/web-based documentation available?

8) Mission Assurance:

a) Is the staffing level and mix adequate?
b) Are all phases of the mission staffed?
c) Is mission assurance conducting high-level oversight to ensure that robust mission success processes are in place?